ABSTRACT

An associative, or content-addressable, memory device (101) and method based on waves is described. In this invention, arbitrary inputs are written as patterns which are interpreted as values of complex waves, discretized or analog, on one or more buffers (102,104). Information

5   is transported via wave propagation from the buffers (102,104) to a cortex (103) or to multiple cortices, where the patterns are (1) associated using a mathematical operation for storage purposes or (2) de-associated through the corresponding inverse operation for retrieval purposes. The present associative memory is shown to emulate important behavioral properties of the human brain, including higher-brain functions such as learning from experience, forming

10   generalizations or abstractions, and autonomous operation.